

Gottlieb System 80 Battery Corrosion Repair Components Kit

Before installing any of the enclosed components - all battery corrosion MUST be cleaned and neutralized from circuit board assembly. For detailed instructions of cleaning and restoring corrosion damaged boards – refer to “Bullet-proofing Gottlieb System 80 Pinballs from 1980 to 1989, Part One” located at <http://www.marvin3m.com/sys80/index.htm>.

The components included with this kit are for the typical area of battery corrosion damage. The corrosion area is usually in the lower left corner of the board surrounding the battery. This kit only covers this section of the board and includes the components listed below. There are many extremes to this type of damage. Sometimes not all of these components are required to perform the repairs. But occasionally, additional parts are required to perform a complete corrosion damage repair. Most of these additional parts are also available at reasonable prices from Great Plains Electronics.

Refer to the System 80 Control Board drawing for locations of these components:

Y1 – 3.57MHz Crystal, Part number MP-1-3.579545MHz
Z1 – Dual Monostable Multivibrator, Part type 4528
Z2 – Dual D-Type flip-flop, Part type 74HCT74. Better than original replacement for original 7474.
Z3 – Hex inverter, Part type 7404
Z4 – Quad 2-Input AND Gate, Part type 4081
Z36 – Hex inverter, Part type 4069
14 Pin IC Socket's (4ea) for Z2, Z3, Z4 and Z36
16 Pin IC Socket (1ea) for Z1
SW1 – DIP Switch, 8-Position
C1 – Capacitor, 100uF, Axial Electrolytic
C2 – Capacitor, 0.01uF, Axial Ceramic – Part marking = 103
C3 – Capacitor, 0.1uF, Axial Ceramic – Part marking = 104
C5 – Capacitor, 0.01uF, Axial Ceramic – Part marking = 103
C25 – Capacitor, 0.1uF, Axial Ceramic – Part marking = 104
C36 – Capacitor, 10uF, Axial Tantalum – Part marking = 106
CR1 through CR8 – Diode, Switching, Part type 1N4148
CR33 – Diode, Switching, Part type 1N4148
CR34 – Diode, Switching, Part type 1N4148
CR35 – Diode, Switching, Part type 1N4148
R3 – Resistor, 5.6K ohm, ¼ Watt, 5% (Green, Blue, Red, Gold)
R4 – Resistor, 2.0K ohm, ¼ Watt, 5% (Red, Black, Red, Gold)
R5 – Resistor, 2.0K ohm, ¼ Watt, 5% (Red, Black, Red, Gold)
R6 – Resistor, 3.0K ohm, ¼ Watt, 5% (Orange, Black, Red, Gold)
R7 – Resistor, 62 ohm, ¼ Watt, 5% (Blue, Red, Black, Gold)
R8 – Resistor, 180 ohm, ¼ Watt, 5% (Brown, Gray, Brown, Gold)
R9 – Resistor, 1.0K ohm, ¼ Watt, 5% (Brown, Black, Red, Gold)
R34 through R41 – Resistor, 4.7K ohm, ¼ Watt, 5% (Yellow, Purple, Red, Gold)
R43 – Resistor, 5.6K ohm, ¼ Watt, 5% (Green, Blue, Red, Gold)
R44 – Resistor, 2.0K ohm, ¼ Watt, 5% (Red, Black, Red, Gold)
R45 – Resistor, 3.0K ohm, ¼ Watt, 5% (Orange, Black, Red, Gold)
R46 – Resistor, 3.0K ohm, ¼ Watt, 5% (Orange, Black, Red, Gold)
R47 – Resistor, 24K ohm, ¼ Watt, 5% (Red, Yellow, Orange, Gold)
R48 – Resistor, 3.0K ohm, ¼ Watt, 5% (Orange, Black, Red, Gold)
R49 – Resistor, 5.6K ohm, ¼ Watt, 5% (Green, Blue, Red, Gold)
R50 – Resistor, 180 ohm, ¼ Watt, 5% (Brown, Gray, Brown, Gold)
R54 – Resistor, 3.0K ohm, ¼ Watt, 5% (Orange, Black, Red, Gold)
Q1 – Transistor, 2N4403 or 2N3906 (Alternate for MPSA70)
Q2 – Transistor, 2N4401 or 2N3904 (Alternate for 2N4400)
Q3 – Transistor, 2N4401 or 2N3904 (Alternate for 2N4400)
Q4 – Transistor, 2N4403 or 2N3906 (Alternate for MPSA70)
VR1 – Diode, Zener, 3.0Volt, Part type 1N5225B

Notes:

1 – The active components in this kit (IC's, diodes and transistors) are susceptible to Electrostatic Discharge (ESD or static electricity). These components can be damaged by less static electricity than is noticeable by human touch. User must be grounded to dissipate static electricity buildup prior to handling these components.

2 – The following components are polarized – there is only one proper orientation to install these parts. Examine the original board and assembly drawing for proper orientation. Failure to follow these instructions may result in physical damage to these or other components when powered up.

Polarized components: Z1, Z2, Z3, Z4, Z36, C1, C36, CR1 through CR8, CR33, CR34, CR35, Q1, Q2, Q3, Q4, and VR1. Also, care should be taken to orient IC sockets in proper direction – the socket's pin one indicator should be oriented such that pin one of the IC socket matches that of the IC to be installed.

Parts List - Gottlieb System 80

Item	Qty	Part Number	Description	Reference
1	1	CEA-100uF-10v	Capacitor, Axial Electrolytic, 100uF, 10V	C1
2	25	CCA-0.01uF-50v	Capacitor, Axial Ceramic, 0.01uF, 50V	C2, C4, C5, C8-12, C15-24, C26, C27, C31-C35
3	4	CCA-0.1uF-50v	Capacitor, Axial Ceramic, 0.1uF, 50V	C3, C14, C25, C30
4	1	CTA-10uF-10v	Capacitor, Axial Tantalum, 10uF, 10V	C36
5	35	1N4148	Switching Diode	CR1-CR35
6	2	2N4403	Transistor, PNP	Q1, Q4
7	2	2N4401	Transistor, NPN	Q2, Q3
8	26	RCF1/4-3.0K	Resistor, 3.0K ohm, 1/4 watt	R1, R6, R11-R24, R42, R45, R46, R48, R51, R52, R54-R57
9	9	RCF1/4-4.7K	Resistor, 4.7K ohm, 1/4 watt	R2, R34-R41
10	3	RCF1/4-5.6K	Resistor, 5.6K ohm, 1/4 watt	R3, R43, R49
11	3	RCF1/4-2.0K	Resistor, 2.0K ohm, 1/4 watt	R4, R5, R44
12	1	RCF1/4-62	Resistor, 62 ohm, 1/4 watt	R7
13	2	RCF1/4-180	Resistor, 180 ohm, 1/4 watt	R8, R50
14	1	RCF1/4-1.0K	Resistor, 1.0K ohm, 1/4 watt	R9
15	1	RCF1/4-2.7M	Resistor, 2.7M ohm, 1/4 watt	R10
16	9	RCF1/4-620	Resistor, 620 ohm, 1/4 watt	R25-R33
17	1	RCF1/4-24K	Resistor, 24K ohm, 1/4 watt	R47
18	4	206-8	DIP Switch, 8 Position	SW1-SW4
19	1	IS-640-MP	IC Socket, 40 Pin, 0.6"	TC1
20	1	6502	IC, Central Processing Unit (CPU)	U1
21	1	U2-ROM	IC, Read Only Memory	U2
22	1	U3-ROM	IC, Read Only Memory	U3
23	3	6532	IC, RAM, I/O, Timer (RIOT)	U4-U6
24	1	PROM1	IC, Read Only Memory	PROM1
25	1	PROM2	IC, Read Only Memory	PROM1
26	1	1N5225B	Diode, Zener, 3.0V, 500mW	VR1
27	1	MP-1-3.579545MHZ	Crystal, 3.57MHz	Y1
28	1	4528	IC, Dual Monostable Multivibrator	Z1
29	1	7474 or 74HCT74	IC, Dual D-Type Flip-Flop	Z2
30	10	7404	IC, Hex Inverter	Z3, Z11, Z12, Z16, Z17, Z24, Z26, Z27, Z34, Z35
31	1	4081	IC, Quad 2-Input AND Gate	Z4
32	1	5101	IC, Memory, 256 x 4	Z5
33	1	74LS04	IC, Hex Inverter	Z7
34	1	7402	IC, Quad 2-Input NOR Gate	Z8
35	3	7400	IC, Quad 2-Input NAND Gate	Z9, Z13, Z14
36	1	74LS05	IC, Hex Inverter, Open Collector	Z10
37	1	7432	IC, Quad 2-Input OR Gate	Z15
38	3	74175	IC, Quad Register	Z18, Z20, Z22
39	2	74154 or 74HCT154	IC, 4:16 Decoder	Z25, Z33
40	1	74LS139	IC, Dual 2:4 Decoder	Z28
41	2	7416	IC, Hex Inverter, Open Collector	Z29, Z30
42	1	7408	IC, Quad 2-Input AND Gate	Z31
43	1	7417	IC, Hex Buffer, Open Collector	Z32
44	1	4069	IC, Hex Inverter	Z36

